

Appl. No. 10/707,970  
Response Dated February 9, 2006  
Reply to Office Action Dated November 10, 2005

**Amendments to the Claims:**

This listing of the claims will replace all prior versions, and listings, of the claims in the application.

**Listing of Claims:**

Please amend the claims as follows without prejudice. No new matter has been added by way of these amendments.

**What is Claimed Is:**

1. (Currently Amended) A gap collar for an electromagnetic communication unit of a downhole tool positioned in a wellbore, the downhole tool communicating with a surface unit via an electromagnetic field generated by the electromagnetic communication unit, the gap collar comprising:

a first collar having a first end connector;

a second collar having a second end connector matingly connectable to the first end connector;

a non-conductive insulation coating disposed on one of the first end connector, the second end connector and combinations thereof, the insulation coating ~~adapted~~ defining a gap to electrically insulate the first and second end connectors; and

a non-conductive insulation molding ~~positioned extending across the gap~~ about one of an inner surface of the collars, an outer surface of the collars and combinations thereof, the insulation moldingly conforming to the shape thereof.

2. (Original) The gap collar of claim 1 further comprising a non-conductive protective molding positioned about the outer surface of the collars.

3. (Original) The gap collar of claim 2 wherein the protective coating is plastic.

4. (Original) The gap collar of claim 2 further comprising a wear band positioned about at least a portion of the protective coating.

5. (Original) The gap collar of claim 4 wherein the wear band is metal.

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6. (Original) The gap collar of claim 1 further comprising a metal ring positioned between a shoulder portion of the collars and in contact therewith.
7. (Currently Amended) The gap collar of claim 6 wherein at least one cavity is present between the ~~bearing ring~~ and collars, the gap collar further comprising an epoxy positioned in the at least one cavity.
8. (Original) The gap collar of claim 1 further comprising a non-conductive sleeve positioned along an inner surface of the collars.
9. (Original) The gap collar of claim 8 wherein the non-conductive sleeve is plastic.
10. (Original) The gap collar of claim 1 further comprising a wear band positioned about the outer surface of at least a portion of at least one of the collars.
11. (Original) The gap collar of claim 10 wherein the wear band is metal.
12. (Original) The gap collar of claim 1 wherein the connectors of the collars are mated threads.
13. (Original) The gap collar of claim 12 wherein the mated threads are standard threads.
14. (Original) The gap collar of claim 12 wherein at least one of the mated threads is modified to receive the insulation coating.
15. (Currently Amended) The ~~he~~ gap collar of claim 1 wherein the downhole tool is one of a drilling tool, a coiled tubing tool, a wireline tool, a slickline tool and combinations thereof.
16. (Original) The gap collar of claim 1 wherein the downhole tool is a drilling tool is operatively connected to a drill string and has a passage therethrough and a mandrel therein, and wherein the collars are drill collars operatively connectable to the drill string.
17. (Original) The gap collar of claim 16 wherein the non-conductive insulation molding is positioned about one of the mandrel, the inner surface of the drill collars, the outer surface of the drill collars and combinations thereof.
18. (Original) The gap collar of claim 1 wherein the insulation coating is a ceramic.
19. (Original) The gap collar of claim 1 wherein the insulation molding is rubber.
20. (Original) The gap collar of claim 1 wherein the insulation molding forms a hydraulic seal.
21. (Original) The gap collar of claim 1 wherein the collars with insulation coating therebetween define a capacitive element.

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22. (Currently Amended) A downhole electromagnetic telemetry unit for communication with a surface electromagnetic communication unit, the downhole electromagnetic telemetry unit disposed in a downhole tool positioned in a wellbore, the downhole electromagnetic telemetry unit comprising:

a gap collar comprising a first conductive collar, a second conductive collar and a non-conductive insulation coating therebetween, the nonconductive insulation coating defining a gap;

electromagnetic circuitry operatively connected to each conductive collar whereby an electromagnetic field is generated and modulated; and

a non-conductive insulation molding ~~positioned~~ extending across the gap about one of an inner surface of the collars, an outer surface of the collars and combinations thereof, the insulation molding conforming to the shape thereof.

23. (Original) The downhole electromagnetic unit of claim 22 wherein the first collar has a first end connector and the second collar has a second end connector matingly connected to the first end connector.

24. (Original) The downhole electromagnetic unit of claim 23 wherein the end connectors each have threads matingly connectable together.

25. (Currently Amended) The ~~he~~ downhole electromagnetic unit of claim 22 wherein the electromagnetic circuitry comprises a processor and a transceiver.

26. (Original) The downhole electromagnetic unit of claim 22 further comprising a memory storage unit.

27. (Original) The downhole electromagnetic unit of claim 22 further comprising at least one sensor adapted to measure downhole parameters.

28. (Currently Amended) A method of generating an electromagnetic field from a downhole tool positioned in a wellbore, the downhole tool having electronic circuitry adapted to communicate with a surface unit via the electromagnetic field, the method comprising:

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providing the downhole tool with a gap collar to house the electromagnetic circuitry, the gap collar comprising a first and a second conductive collar matingly connected together with a non-conductive insulation coating defining a gap therebetween to form a capacitive element;

moldingly conforming a non-conductive insulation molding such that the non-conductive insulation molding extends cross the gap about one of an inner surface of the collars, an outer surface of the collars and combinations thereof such that the ~~insulative~~ insulative molding conforms to the shape thereof; and

applying the electromagnetic field across the gap collar.

29. (Original) The method of claim 28 wherein the first and second conductive collars have mated connectors and wherein the non-conductive insulation coating is disposed on at least one of the mated connectors.

30. (Original) The method of claim 29 wherein the mated connectors have mated threads.

31. (Original) The method of claim 30 further comprising modifying the mated threads of at least one of the mated connectors from a standard dimension to a modified dimension.

32. (Original) The method of claim 28 further comprising torquing the first and second conductive collars together to form a secure connection without breaking the non-conductive insulation coating therebetween.

33. (Currently Amended) The method of claim 28 wherein the gap collar has a passage therethrough and a mandrel therein, the step of moldingly conforming comprising moldingly conforming a non-conductive insulation molding about one of an inner surface of the collars, an outer surface of the collars, an outer surface of the mandrel and combinations thereof such that the ~~insulative~~ insulative molding conforms to the shape thereof.

34. (Original) The method of claim 28 further comprising positioning a non-conductive protective coating on an outer surface of one of the collars, the insulation molding and combinations thereof.

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35. (Original) The method of claim 28 further comprising positioning a non-conductive sleeve along the inner surface of the collars.

36. (Original) The method of claim 28 further comprising positioning a metal ring between a shoulder portion of the collars and in contact therewith.

37-43. (Cancelled)

44. (Currently Amended) A gap collar for an electromagnetic communication unit of a downhole tool positioned in a wellbore, the downhole tool communicating with a surface unit via an electromagnetic field generated by the electromagnetic communication unit, the gap collar comprising:

a first collar having a first threaded end connector;

a second collar having a second threaded end connector matingly connectable to the first threaded end connector;

a non-conductive insulation coating disposed on one of the first threaded end connector, the second threaded end connector and combinations thereof, the insulation coating defining a gap adapted to electrically insulate the first and second threaded end connectors; and

a non-conductive insulation molding ~~positioned~~ extending across the gap about one of an inner surface of the collars, an outer surface of the collars and combinations thereof

wherein one of the first threaded end connector, the second threaded end connector and combinations thereof are modified from a standard threaded end connector to receive the non-conductive insulation coating whereby the contact area between the threaded connectors is increased.

45. (Original) The gap collar of claim 44 wherein the insulation moldingly conforms to the shape thereof.

46. (Original) The gap collar of claim 44 further comprising a metal ring positioned between a shoulder portion of the drill collars to establish contact therebetween.